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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,909	11/02/2001	Ping Yuan	MUL-003	5064

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EXAMINER

NGUYEN, DILINH P

ART UNIT PAPER NUMBER

2814

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/002,909	<b>Applicant(s)</b> YUAN, PING	
	<b>Examiner</b> DiLinh Nguyen	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All   b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 5) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election of Group I, claims 1-7 in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Objections***

Claim 4 is objected to because of the following informalities:

The phrase: "...a second doped layer..." should be changed the second doped layer.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (fig. 1) in view of AAPA (fig. 2).

AAPA (fig. 1) discloses a semiconductor device comprising:

an absorption narrow bandgap layer 76;

a first doped layer 68 having a first conductivity type P;

a passivation region 32 disposed substantially adjacent to the first doped layer.

AAPA (fig. 1) fails to disclose a wide bandgap layer disposed substantially adjacent to the absorption layer.

AAPA (fig. 2) discloses a wide bandgap layer disposed substantially adjacent to the absorption layer 76. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA (fig. 1) to avoid the introduction of defects into the intrinsic absorption layer, as shown by AAPA (fig. 2).

- Regarding claim 2, AAPA (fig. 2) discloses a second doped layer 28 disposed substantially adjacent to the absorption narrow bandgap layer.
- Regarding claim 3, AAPA (fig. 1) discloses a third doped layer 64 disposed substantially adjacent to the first doped layer and adapted to form an ohmic contact with a substantially adjacent metalization layer.
- Regarding claim 5, AAPA (fig. 1) discloses the first doped layer 68 comprises indium phosphide.
- Regarding claim 6, AAPA (fig. 1) disclose the absorption layer comprises indium gallium arsenide.
- Regarding claim 7, AAPA (fig. 2) discloses the wide bandgap layer 20 varies in thickness from an etching thickness  $t_1$  to a deposition thickness  $t_2$ .

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (fig. 1) in view of AAPA (fig. 2) and further in view of Lai et al. (U.S. Pat. 6452221).

AAPA (fig. 1) disclose the absorption narrow bandgap layer 76 and the second doped layer 80 but fail to disclose an impact layer disposed substantially adjacent to the second doped layer and the absorption narrow bandgap layer.

Lai et al. disclose a semiconductor device comprising :

an intrinsic layer 16 (cover fig.), wherein the intrinsic layer 16 comprises InAlAs; therefore, the intrinsic layer is clearly has a ratio of the ionization coefficient for electrons relative to the ionization coefficient for holes for the impact layer is larger than the corresponding ratio for the absorption narrow bandgap layer, the wide bandgap layer, the first doped layer, and the second doped layer of AAPA (fig. 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA to make the device more robust, low noise and long term operation effects, as shown by Lai et al.

### ***Conclusion***

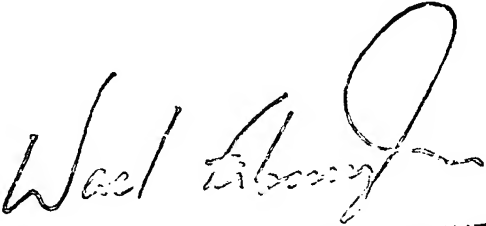
Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (703) 305-6983. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN  
May 1, 2003

  
SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800